

# Evaluation of Antenatal to Neonatal Continuum Care Services Affecting Neonatal Health in a Tertiary Health-Care Setup

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## ABSTRACT

**Background:** Maternal and child mortality and morbidity continue to be high despite existence of various national health programmes in India. Annually 41% of all Under 5 mortality is comprised of neonates, 3/4 of who die within the first week of life. Even though effective programmes are existing, optimum utilization is still a question. So the present study was planned to assess utilisation of maternal and neonatal health services and its influence on neonatal health. **Objectives:** 1. To assess the utilization of MCH services before admission to SNCU. 2. To analyse the process of implementation of IMNCI before referral and during the admission. 3. To observe the impact on neonatal health and give necessary recommendations. **Methodology:** The information regarding utilization of MCH services was obtained by conducting in depth interviews with the responsible adults accompanying the sick neonate. The Pre-treatment and referral slips were verified and compared with that of the prescribed guidelines laid down by the IMNCI for young infants (0-2 months) at SNCU. **Results and Discussion:** Some of the important observations were mentioned here. 100% women had TT immunization whereas 72% had the full ANC, 58.7% had full course of IFA, 76% had utilized JSY benefits and 48.34% had their PNC. 84% neonates had required immunization, 59.01% were on exclusive breast feeding, 38.9% were paid home visits, only 42% had an idea about the danger signs of neonatal period. 23% sick babies were treated under IMNCI guideline. Among them 98% given initial treatment, only 34% given proper diagnosis/classification, 56% were given adequate advice.

**Keywords:** Anemia, antenatal checkup (ANC), Integrated Management of Neonatal and Childhood Illnesses (IMNCI), low birth weight, maternal and child health (MCH), postnatal checkup (PNC), sick newborn care unit (SNCU)

## Introduction

The Sample Registration System (SRS) Data 2010 says the neonatal mortality rate (NMR) dipped just by 1 point to 33, which had been constantly high, since Millennium Development Goals (MDG) focus on reduction in mortality rates in infants and children under 5 year. Each year nearly

3.3 million babies are still born and more than 4 million die within 28 days of their birth.<sup>(1)</sup> To reduce NMR focus should be on antenatal to neonatal continuum care services. The deficiency starts with inadequate antenatal

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care. One of the important factors is nonutilization or underutilization of health-care maternal and child health (MCH) services and improper implementation of different programs. So, the present study unveils the status of utilization of maternal and neonatal care services and its impact on neonatal health in a tertiary health-care setup.

### Objectives

1. To assess the utilization of MCH services before admission to Sick Newborn Care Unit (SNCU).
2. To analyze the process of implementation of the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) guidelines before referral and during the admission.
3. To assess the knowledge of mothers of sick neonates about maternal and childcare and observe its impact on neonatal health.

## Materials and Methods

### Study design

Hospital-based observational study.

### Study duration

Two years.

### Study area

SNCU of Maharaja Krishna Chandra Gajapati (MKCG) Medical College and Hospital.

### Study population

All of the patients registered at SNCU of MKCG Medical College and Hospital either referred from O and G/ Pediatric Indoor or from other nearby PHC/private hospitals from Jan 2011 to June 2012 constituted the study population.

### Inclusion criteria

All the sick neonates who needed special care were admitted to SNCU.

### Exclusion criteria

1. Neonates referred directly or from O and G and Pediatrics department with minor complaints such as feeding problem or premature and preterm babies who require routine checkups.
2. Neonates whose mothers were noncooperative and did not give consent.

### Methodology

The information regarding utilization of MCH services was obtained by conducting in-depth interviews with the parents/responsible adults who had accompanied the case. The pretreatment and referral system if any was verified from the cases and compared with that of the prescribed guidelines laid down by the IMNCI

for young infants (0-2 months). Likewise the clinical information on treatment offered and outcome of the case was collected from case sheets and follow-up visits. All the information of each case was collected over a predesigned schedule.

### Statistical analysis

Statistical analysis was done studying the percentages, proportions, and Chi-square using Statistical Package for the Social Sciences (SPSS) version 17 (SPSS-Inc., Chicago, US).

## Results

As per the information given by the mothers of sick neonates, all of them had taken the two doses of tetanus toxoid (TT) immunization but only 72% had attended the full antenatal checkups (ANC) ( $\geq 4$  ANC), 58.7% mothers had taken the full course of iron and folic acid (IFA) tablets (100 tabs), 1,779 (87.1%) had undergone institutional delivery among whom 1,552 (90.4%) had utilized the Janani Surakshya Yojana (JSY) scheme benefits, and out of 1,717 (96.5%) eligible mothers, 48.34% had taken their postnatal checkups (PNC) [Table 1].

Similarly, during the interview regarding neonatal health services it was observed that 84% neonates had taken the required immunization, 56.6% neonates had some sort of prelacteal feeding, 59.01% sick neonates were on exclusive breast feeding, and rest were on artificial milk or other fluids. Among the 2,042 sick neonates admitted, 189 babies [extremely low birth weight ( $<1,000$  gm.) baby + low birth weight ( $<1,500$  gm.) baby] were unable to suck the breast milk in the first day and were on external fluids. Therefore, only 53.03% of the neonates were initiated breast feeding within 1 h, and 38.9% were paid home visits by Anganwadi workers (AWWs) at least once after delivery (excluding the first visit that is on the first day of birth) [Table 2].

The knowledge of mothers regarding danger signs during pregnancy, delivery, postpartum, and neonatal period was accessed on a qualitative scale as good, average, and poor. (Able to tell all the danger signs – good, some

**Table 1: Health-care facility provided to mothers of sick neonate during pregnancy**

Health services provided to mother	Number of cases (N = 2,042)	Percentage (%)
TT immunization (2 doses)	2,042	100.00
Full ANC ( $>3$ ANCs)	1,470	72.00
Full course of IFA (100 IFA tablets)	1,198	58.70
Institutional delivery	1,779	87.10
JSY utilized	1,552/1,717	90.4
PNC visits by health-care providers (at least one visit excluding mothers of day 1 neonates)	987	48.34

danger signs – average, not able to tell or describe any of the danger signs – poor). It was observed that a very few mothers (23.8%) had a knowledge about danger signs of pregnancy, labor and puerperal period, and when the mothers inquired about the knowledge of danger signs of neonatal period, only 48% among all mothers had an idea

**Table 2: Neonatal (home/health) facility availed after delivery**

Health services provided to neonates	Number of cases (N = 2,042)	Percentage (%)
Initiation of breast feeding <1 h	1,083	53.03
Exclusive breast feeding till now	1,205	59.01
Visit by AWW according to the IMNCI norm	794	38.90
Taken required immunization	1,715	84.00

**Table 3: Knowledge level among mothers of sick neonates about maternal, newborn, and childcare**

Knowledge level among mothers	Good (%)	Average (%)	Poor (%)
Awareness of danger signs of neonatal illnesses	857 (42)	980 (48)	205 (10)
Knowledge regarding danger signs of pregnancy, labor, and puerperium	486 (23.8)	755 (36.9)	801 (39.3)
Knowledge regarding proper breast feeding practices	292 (14.3)	469 (23)	1,281 (62.7)

**Table 4: Frequency of sick neonates referred following the IMNCI guidelines among out born (referred) cases**

Pre referral treatment given to sick neonate	Number of cases (N = 1,138)	Percentage (%)
According to IMNCI	262	23.00
Not according to IMNCI	876	77.00
Total	1,138	100.00

**Table 5: Assessment and management of sick neonates prior to referral**

Services provided prior to referral	Number of Cases (N = 1162) (out born)	Percentage (100%)
Diagnosis and classification	395	34.00
Initial treatment	1,138	98.00
Advise during transport	650	56.00

**Table 6: Relation of neonatal health (birth weight) with anemia of mother**

Full IFA course	LBW	NBW	Total
Taken	461 38.48%	737 61.52%	1,198 58.70%
Not taken	704 83.42%	140 16.58%	844 41.30%
Total	1,165 57.05%	877 42.95%	2,042 100.00%

The two-tailed *P* value is <0.0001. The association is extremely statistically significant

about one or more danger signs. Similarly, knowledge regarding proper breast-feeding practices is also poor in majority of the cases (62.7%) [Table 3].

Out of all 2,042 cases, a few cases admitted directly into the SNCU including cases from O and G and Pediatric Department while others had undergone prereferral treatment either at the govt. PHC/CHC, private clinic or health worker (M/F)/AWW before being admitted. A smaller number of patients had received some medications for their symptoms from a medicine shop located at a nearby area. Out of the 1,162 (56.9%) out born (cases admitted for treatment from outside hospital) neonates referred, 1,138 (98%) had taken initial/prereferral treatment. Out of 1,138 sick neonates who had received prereferral/initial treatment, only 262 (23%) sick babies were treated under the IMNCI guidelines, while the rest 876 (77%) had received treatment from govt. PHC/CHC and private clinics but proper IMNCI guidelines for diagnosis/classification and treatment were not followed [Table 4]. Although initial treatment for stabilization of sick neonate was offered in 98% of referred cases, only 34% of the referral slip contains “diagnosis/classification” written on it along with “treatment”. Whereas 56% were given proper advice during the transport [Table 5].

In this study, it was observed that out of all the mothers, only 58.7% had taken full course of IFA. Among them, 38.48% had poor perinatal outcome in terms of low birth weight newborns. Whereas mothers who had incomplete course of IFA, the occurrence of low birth weight was more common (83.42%) [Table 6]. The association between the mother’s IFA intake status and the occurrence of low birth weight is considered to be extremely statistically significant. (The two-tailed *P* value is <0.0001.) Thus, maternal IFA intake is directly proportional to birth weight of the baby. The mother’s diet has a direct influence on the weight of the baby at birth.

Among the 449 (22%) cases referred immediately, 355 (17.4%) were discharged after cure, rest either left against medical advice (LAMA) or further referred to higher facility, but 50 (2.47%) could not make it and died. Similarly cases who were admitted after 2-7 days (63%) of illness were given initial treatment and referred, 44.16% were discharged, and 11.2% died. Among the 305 cases (15%) referred after 7 days of illness, only 5% were discharged and 6.5% died due to severity

**Table 7: Relation of time of referral and outcome of cases in terms of discharge and death**

Duration of referral	Immediately		Within 2-7 days		>7 days		Total	
Cases referred	449	22%	1,286	63%	307	15%	2,042	100%
Discharged after cure	355	17.4%	902	44.16%	102	5%	1,359	66.56%
Death	50	2.47%	229	11.2%	133	6.5%	412	20.17%

The two-tailed *P* value is <0.0001. The association is extremely statistically significant

of illness [Table 7]. When the association between duration of referral and neonatal outcome in terms of death is compared it was considered to be extremely statistically significant. The two-tailed *P* value is <0.0001. Thus, duration of referral is directly proportional to the outcome of baby. The delay in referral leads to high chances of mortality.

## Discussion

Utilization of available health services and knowledge regarding different health services is a crucial entity in present scenario when the maternal mortality and under 5 mortality is high due to the ignorance and unawareness of the people toward available health services.

There are many programs and policy-making services are available to the needy, but the actual picture is completely different at the ground level. The utilization of the services is far from satisfactory. This might be attributed either by the improper implementation of programs on one side or by lack of utilization of health services on the other side.

The traditional beliefs about pregnancy, childbirth, and new born care coupled with misconceptions, ignorance, and of hospitals have led many neonatal admissions to SNCU. Our study reflects the actual picture of implementation of programs and schemes along with knowledge, attitude, and practice of people toward MCH care utilization at the ground level.

This study revealed 100% TT immunization status among mothers of sick neonates but when coming to the oral intake of IFA tablets the coverage was low. Other studies also found intake of IFA tablets low,<sup>(3)</sup> so as TT immunization of mothers.<sup>(4)</sup> This might be due to the increasing awareness toward immunization or due to intolerability of IFA tablets leading to preference for injections.

The rate of institutional deliveries is undoubtedly higher as compared to home deliveries. But deliveries are still being conducted at home in unhygienic condition by unskilled workers contributing to the poor health of neonates despite several awareness programs initiated for mother and childcare. When asked about ANC during pregnancy and PNC visits (excluding the day 1 neonates) by health-care providers after delivery, the coverage of full ANC and minimum PNC visits was low. Similar findings observed in different studies<sup>(2-5)</sup> where home deliveries were still going on and full (>4) ANC rate and minimum PNC coverage rate was very low. This is attributed by lack of knowledge regarding MCH care in the community or by unawareness toward different services available to them.

Almost 90% of mothers utilized the JSY services out of all the eligible mothers. Likewise, another study by Panja *et al.*<sup>(3)</sup> shows that 50.5% utilized JSY services. This might be due to increasing awareness toward the scheme and of course the benefits due to financial assistance provided them to overcome the expenses during pregnancy and delivery.

Regarding breast-feeding practices more than half of the neonates had prelacteal feeding. But early initiation of breast feeding within 1 h and exclusive breast feeding were mostly limited to a small group of babies. This indicates the fact that more than half of the admissions were related to faulty practices of breast feeding and neonatal care. This could be due to lack of knowledge regarding the importance of breast milk in child growth, development, and protection from malnutrition and various infections. It was supported by some studies<sup>(4,8)</sup> which revealed that more than half new born babies had received breastfeeding early. Whereas other studies<sup>(6,7,9)</sup> had shown the prevalence of practice of pre-lacteal feeding and majority with delay in early initiation of breast feeding.

Majority of neonates were immunized and were on exclusive breast feeding except for those who had very low weight and were unable to suck breast milk. But home visits (minimum three for normal and six for low birth weight babies) paid by AWWs according to the IMNCI guidelines towards the well-being of newborn and diagnose early signs of neonatal illness were way too less than required. This might be due to negligence in the part of service providers or unawareness and lack of training of AWWs on the IMNCI guidelines. However, study by Chen *et al.*<sup>(10)</sup> observed that among women who received postnatal care, 37% received counseling or guidance on infant feeding and 32% on cord care. twenty-four percent of women reported that the service provider checked for jaundice in their newborns and 18% were consulted on danger signs and thermal care of their newborns.

Majority had poor knowledge regarding danger signs of antenatal, intranatal, postnatal period and average knowledge about neonatal period. Poor knowledge was noticed among mothers regarding proper childcare and breast-feeding practices. Similar findings were found in other studies.<sup>(11-13)</sup>

Majority of the cases had taken the initial treatment before being referred. However, only one-fourth of neonates had prereferral treatment following the IMNCI guidelines. Most of the referral slips that were examined and analyzed did not have proper classification and diagnosis with necessary advice during transport. There are still many barriers on the road to health



such as illiteracy, lack of awareness, social culture and taboos, and failure of health provider and system on their part in the implementation programs and policies. The IMNCI should be a part of India's strategy to achieve the millennium development goal on child survival. A study by Anand<sup>(14)</sup> which states that the workers' disease classification and management was not satisfactory, especially for pneumonia and sick neonates. Similarly, a study by Biswas *et al.*<sup>(15)</sup> observed that the skills of assessment were acquired by majority of the workers. Around two-thirds workers synthesized correct classification and nearly 60% gave appropriate management of at least one subgroup.

Low birth weight babies were predominant in mother's who had not taken full course of IFA tablets compared to others who had taken. This may be attributed by the poor nutrition and health of mother (anemia and malnutrition) due to incomplete course of IFA tablets resulted by intolerability or by social and cultural misconceptions toward intake of IFA among mothers. Maternal anemia and nonconsumption of IFA leading to low birth weight and preterm births has been supported by different studies.<sup>(16,17)</sup>

Out of the cases referred immediately maximum were cured and discharged, but among the cases who were referred late to the SNCU death rate was relatively more. This could be due to lack of knowledge of warning signs/danger signs resulting delay in diagnosis, treatment, and proper referral. This indicates the fact that there is absence of a proper referral system for neonatal illnesses in the existing health care delivery system. Likewise, Ujwala Bapat *et al.*<sup>(18)</sup> found that overall, delays in receiving care after arrival at a health facility dominated and were mostly the result of referral from one institution to another. Most delays in seeking care were attributed to a failure to recognize symptoms of complications or their severity.

This study showed that the utilization of maternal and new born care services was poor in the area, likewise knowledge regarding new born care, breast-feeding practices, and awareness regarding danger signs were also found to be low. There was a huge gap between guidelines laid down by programs (IMNCI) and its actual implementation. Even though health system is evolving day by day in the purview of current demand and challenges, still there are many hurdles such as socioeconomic and cultural barriers that are preventing the optimum utilization by people who need them the most. As mother and child regarded as a single unit, maternal health had a great impact on neonatal health and sickness. Reduced neonatal illnesses and death can be achieved by some simple steps such as timely ANC, full course of IFA, institutional delivery, proper

breast-feeding practice and proper assessment and diagnosis, appropriate treatment and timely referral of sick neonates. Awareness-generation activities among pregnant women and mothers of new born about danger signs of pregnancy and neonatal illness can have a positive impact on early case detection and treatment. The implementation of the IMNCI guidelines by the service providers can act as a major step in early diagnosis, prereferral treatment, and timely referral of sick neonates. Training and supervision along with implementation of the IMNCI especially by the AWWs at village level can have a definite impact on reducing neonatal mortality due to illnesses.

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### Conflicts of interest

There are no conflicts of interest.

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